MECHANICS' MAGAZINE,

AND

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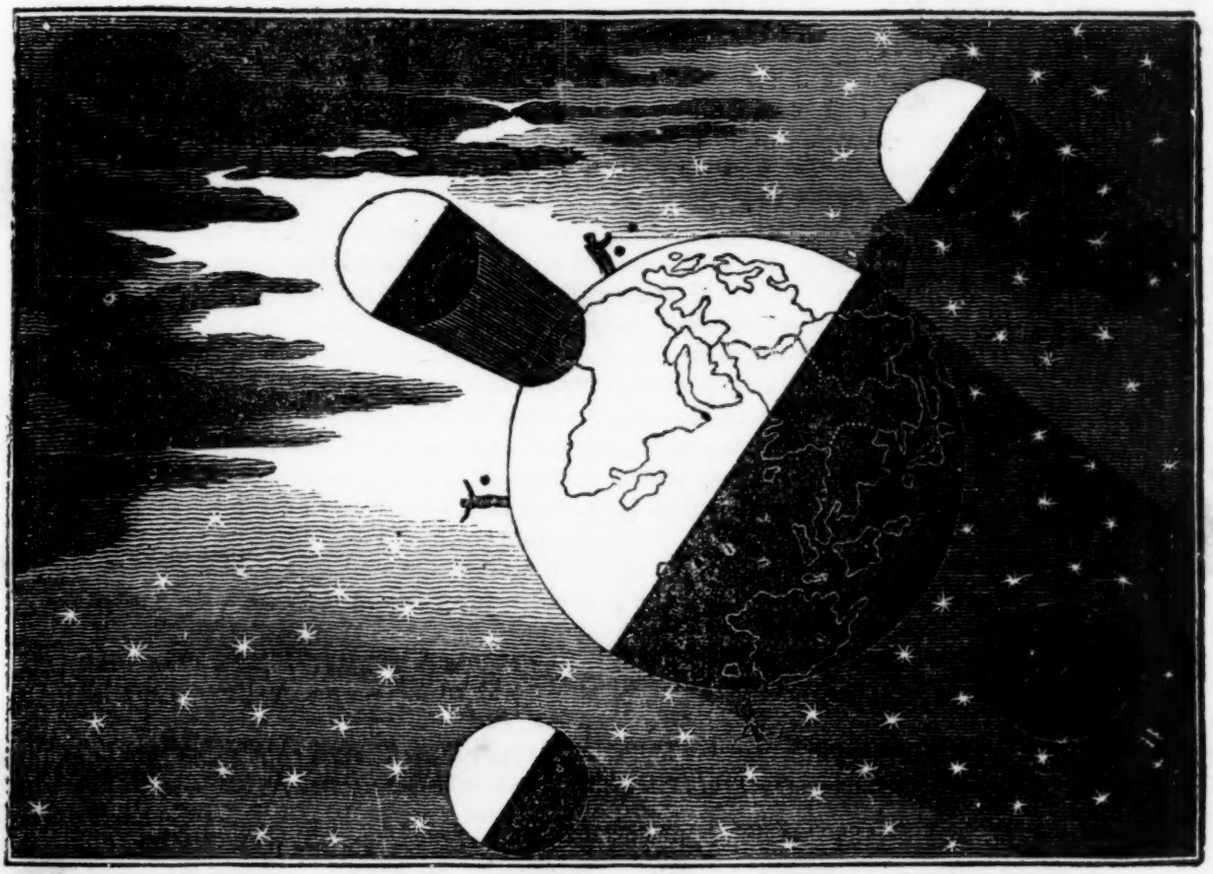
"Utility is the constituent or measure of virtue."—HUME.

APPEARANCE OF THE HEAVENS.



The above engraving represents the heavens, in which the Solar System is considered as forming part; and in order to contemplate a spectacle so grand, let us imagine ourselves upon some high elevation, in an open country, where the view is uninterrupted on every side. The best time for this purpose is upon the setting of the sun, when the western sky is faintly illuminated; at which time we shall see this light fade away by degrees, the darkness increase, night come on, and the sky will appear a vast dome studded with a multitude of brilliant points. These are the stars which the too strong light of the sun has prevented us from perceiving during the day. The disposition of these stars seems to be immutable, which is essentially the same now as it was in periods the most remote. The different clusters are such in their configurations as the ancients described them, when they grouped them together under the name of *constellations*, and, to assist the memory, associated them with the figures of men, animals, &c. But these stars, while they preserve the same order, are carried round the heavens as by a common motion. Those towards the west decline more and more, and disappear when the sun sets; while others, presenting themselves in the east, seem to come from beneath the *horizon*. Rising to different heights in the heavens, they descend again, and set in their turn, like those which preceded them. But if, in our latitude, we place ourselves in such a manner as to have the east on our right, and the west on our left, we shall see in that part of the heavens which is before us, and which we call north, some groups of stars which seem set; such, for example, is the remarkable collection called the "*Great*

Bear." This constellation, and the greater part of those which are found in that part of the heavens, disappear only when their light is lost in that of the sun. They may be seen during the whole of the night, and followed through the lowest part of their course, for they never descend to the horizon. If observed at different times of the night, they will be found to have their positions in the heavens reversed, the natural effect of the rotary movement which they have in common with all the other stars; and the centre about which they move is a point of the heavens situated directly north.

The light that appears in the east at the approach of day, soon becomes strong enough to eclipse the stars which have just risen in that direction; the west is now in darkness, and the scene is the reverse of that which happens at the beginning of the night. The light continuing to increase, the stars grow fainter and fainter, till they at length disappear, and day sheds its brightness upon every object. The sun now presents itself, is seen in the east like the stars; it ascends and passes through the heavens, declines to the west,* and disappears in the part opposite to that in which it rose; when all the phenomena of night are repeated in the manner just described.

By examining the heavens for a number of nights successively, we observe certain *stars* change their places with regard to others; passing from one constellation they pass towards another, which, for a few days, is scarcely perceptible. But these small changes at length become apparent, and the *stars* in which they take place are transferred to different parts of the heavens, on which account they are called *planets*, or wandering stars, to distinguish them from those which preserve the same relative situation, and which are called fixed stars.—[Guide to Knowledge.]

History of Astronomy—its various Systems, &c. [Continued from page 13.]

OF THE CLOUDS.

Ye mists and exhalations that now rise
From hill or steaming lake, dusky or gray,
Till the sun paint your fleecy skirts with gold,
In honor to the world' s Great Author rise,
Whether to deck with clouds th' uncolored sky,
Or wash the thirsty earth with falling showers,
Rising or falling still advance his praise.

MILTON.

Clouds are generally supposed to consist of vapor, which has been raised from the sea and land by means of heat. These vapors ascend till they reach air of the same specific gravity with themselves, when they combine with each other, become more dense and opaque, and then become visible.

The thinner or rarer the clouds are, the higher do they ascend in the air; however, it seldom happens that their height exceeds two miles. The greater number of clouds are suspended at the height of one mile; and when they are highly electrified, their height is not above eight or nine hundred yards.

While Don Ulloa was in South America, measuring a degree of the meridian, he was for some time stationed on the summit of Cotapaxi, a mountain about three miles above the level of the sea, where, he says, the clouds could be seen at a great distance below, and that he could hear the horrid noise of the thunder and tempests, and even see the lightnings issue from the clouds far below him.

The wonderful variety observable in the colors of clouds is owing to their particular position with respect to the sun, and the different reflections of his light. The various figures which they so readily assume is supposed to proceed from their loose and voluble texture, revolving in any form, according to the direction and force of the wind, or to the quantity of electric matter which they contain.

About the tropics the clouds roll themselves into enormous masses, as white as snow, turning their borders into the forms of hills, piling themselves upon each other, and exhibiting the shapes of mountains, caverns, and rocks. "There," says St. Pierre, "may be perceived, amid endless ridges, a multitude of valleys, whose openings are distinguished by purple and vermillion." These celestial valleys exhibit, in their various colors, matchless tints of white, melting into shades of different colors. Here and there may be observed torrents of light issuing from the dark sides of the mountains, and pouring their streams, like ingots of gold and silver, over rocks of coral. These appearances are not more to be admired for their beauty than for their endless combinations, for they vary every instant. What, a moment before, was luminous, becomes colored; what was colored, mingles into shade; forming singular and most beautiful representations of islands and hamlets, arched bridges stretched over wide rivers, immense ruins, huge rocks, and gigantic mountains.

Among the Highlands of Scotlan l, the clouds also display the finest outlines, and assume the most beautiful figures; more es-

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* This is the common language made use of in astronomy, but the sun's appearing to rise and set is caused by the revolution of the earth on its axis, once in every twenty-four hours.

pecially when viewed from their rugged and lofty summits.

"Clouds," says Dr. Thompson, "are not formed in all parts of the horizon at once; the formation begins in one particular spot, while the rest of the air remains clear as before; and though the greatest quantity of vapor exists in the lower strata of the atmosphere, clouds never begin to form there, but always at some considerable height." It is remarkable, says the same author, that the part of the atmosphere at which they form has not arrived at the point of extreme moisture, nor near that point, even a moment before their formation.

They are not formed, then, because a greater quantity of vapor has got into the air than could remain there without passing its maximum. It is still more remarkable, that when clouds are formed, the temperature of the spot does not *always* suffer a diminution, although this may sometimes be the case. On the contrary, the heat of the clouds themselves is sometimes greater than that of the surrounding air. Neither, then, is the formation of the clouds owing to the capacity of air for combining with moisture being lessened by cold. So far from this being the case, we often see clouds, which had remained in the atmosphere during the heat of the day, disappear in the night, after the heat of the air was diminished.

The formation of clouds and rain, then, cannot be accounted for by the principles with which we are acquainted. It is neither to the saturation of the atmosphere, nor the diminution of heat, nor the mixture of airs of different temperatures, as Dr. Hutton supposed; for clouds are often formed without any wind at all, either above or below them; and even if this mixture constantly took place, the precipitation, instead of accounting for rain, would be almost imperceptible.

It is a well-known fact, that evaporation goes on for a month or two together in hot weather, without any rain. This sometimes happens in the temperate zone; and every year in the torrid zone. At Calcutta, during the month of January, in the year 1785, it never rained at all; the mean of the thermometer for the whole month was 66½ degrees; there were no high winds, and, during the greater part of the month, scarcely any wind at all.

As the moisture which is thus raised by evaporation is not accumulated in the atmosphere, above the place from which it was evaporated, it must be disposed of in some other way; but the manner in which this is accomplished is not so well *known*. If it be carried on daily through the different strata of the atmosphere, and wafted to other regions by superior currents of air, it is impossible to account for the different electrical states of the clouds, situated between different strata, which often produce the most violent thunder storms. For vapors are conductors of the electric fluid, and, of course, would daily restore the equilibrium of the whole atmosphere through which they passed. There would, therefore, be no positive and negative clouds, and consequently no thunder storms. Clouds could not have remained in the lower strata of the atmosphere, and been daily carried off by winds to other countries, for there are often no winds at all, during several days, to perform this office; nor would the dews diminish, as they are found to do when the dry weather continues for a long time.

It is impossible for us to account for this remarkable fact, upon any principle with which we are acquainted. The water can neither remain in the atmosphere, nor pass through it in the state of vapor. It must, therefore, assume some other form: but what that form is, or how it assumes it, we do not know.

In order to render the study of meteorology more systematic, Mr. Luke Haward has lately introduced a scientific nomenclator, for distinguishing the various forms or modifications of clouds, which promises to be of great use in this important, but hitherto neglected, branch of physical science.

The simple forms, or modifications, are three in number, and named *Cirrus*, *Cumulus*, and *Stratus*. These are defined by Mr. Haward as follows: The *Cirrus* is composed of parallel, flexuous, or diverging fibres, extensible in any or in all directions.

The *Cumulus*, convex or conical heaps, increasing upwards from a horizontal base.

The *Stratus* is a widely extended, continuous, horizontal sheet, increasing from below.

The intermediate modifications are four in number, each of which is formed from various combinations of the simple modifications just mentioned. They are the *Cirro-cumulus*, the *Cirro-stratus*, the *Cumulo-stratus*, and the *Cumulo-cirro-stratus*, or *Nimbus*; and are defined as follows:

Cirro-cumulus. Small and well-defined roundish masses, in close horizontal arrangement.

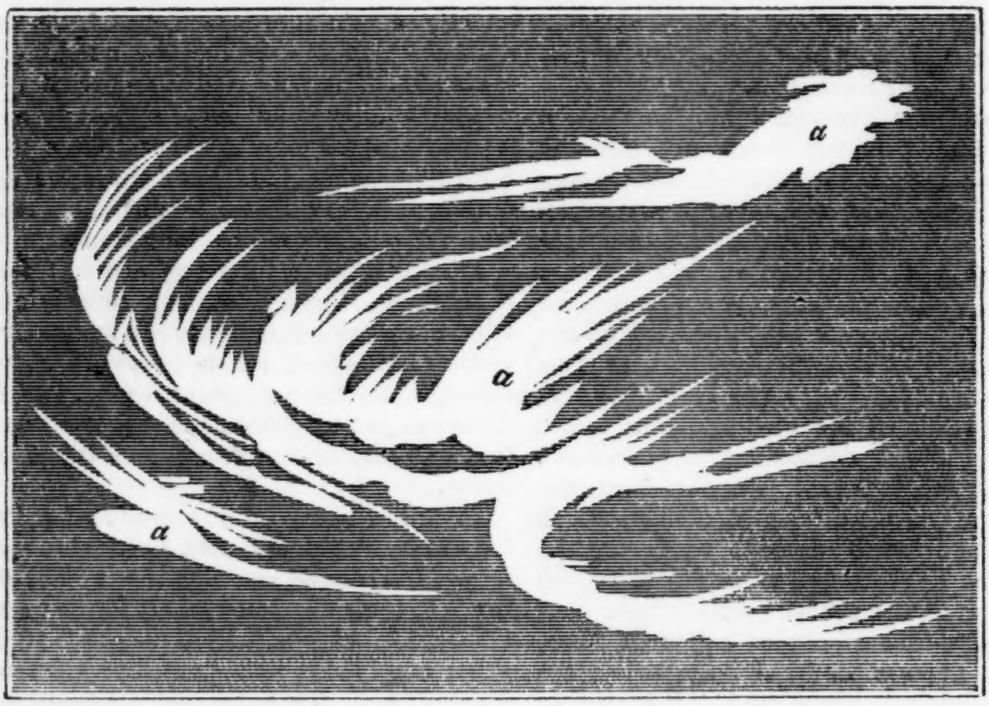
Cirro-stratus. Horizontal or slightly inclined masses, bent downward, or undulated, separate, or in groups consisting of a number of small clouds.

Cumulo-stratus. The cirro-stratus blend-

ed with the cumulus, and either appearing intermixed with the heaps of the latter, or super-adding a wide-spread structure to its base.

Cumulo-cirro-stratus. The rain cloud. A cloud, or system of clouds, from which rain is falling. It is a horizontal sheet, above which the cirrus spreads, while the cumulus enters it laterally, and from beneath.

Of the Cirrus.—Clouds in this modification appear to have the least density, the greatest elevation, and the greatest variety of extent and direction. They are the earliest appearance after serene weather. They are first indicated by a few threads pencilled as it were on the sky. These increase in length, and new ones are in the mean time added laterally. Often the first-formed threads serve as stems to support numerous branches, which, in their turn, give rise to others. This modification is represented by the following figure.



The increase is sometimes perfectly indeterminate, at others it has a very decided direction. Thus, the first few threads being once formed, the remainder shall be propagated either in one, two, or more directions, laterally, or obliquely, upward or downward, the direction being often the same in a great number of clouds visible at the same time.

Their duration is uncertain, varying from a few minutes after the first appearance to an extent of many hours. It is long when they appear alone and at great heights, and shorter when they are formed lower and in the vicinity of other clouds.

This modification, although in appearance almost motionless, is intimately connected with the variable motions of the atmosphere. Considering that clouds of this kind have long been deemed a prognostic of wind, it is extraordinary that the nature of this connection should not have been more studied, as the knowledge of it might have been productive of useful results.

In fair weather, with light variable breezes, the sky is seldom quite clear of small groups of the oblique cirrus, which frequently come on from the leeward, and the direction of their increase is to windward. Continued wet weather is attended with horizontal sheets of this cloud, which subside quickly and pass to the cirro-stratus.

Before storms they appear lower and denser, and usually in the quarter opposite to that from which the storm arises. Steady high winds are also preceded and attended by streaks running quite across the sky in the direction they blow in.

The relation of this modification with the state of the barometer, thermometer, hygrometer, and electrometer, have not yet been attended to.

Of the Cumulus.—Clouds in this modification are commonly of the most dense structure; they are formed in the lower atmosphere, and move along with the current which is next the earth.

A small irregular spot first appears, and is, as it were, the nucleus on which they increase. The lower surface continues irregularly plane, while the upper rises into co-

nical or hemispherical heaps; which may afterwards continue long nearly of the same bulk, or rapidly rise to mountains, as represented by the annexed figure.

In the former case they are usually numerous and near together,—in the latter, few and distant; but whether there are few or many, their bases always lie nearly in one horizontal plan, and their increase upwards is somewhat proportionate to the extent of base, and nearly alike in many that appear at once.

Their appearance, increase, and disappearance, in fair weather, are often periodical, and keep pace with the temperature of the day. Thus they will begin to form some hours after sun-rise, arrive at their maximum in the hottest part of the afternoon, then go on diminishing, and totally disperse about sun-set.

But in changeable weather they partake of the vicissitudes of the atmosphere; sometimes evaporating almost as soon as formed, at others, suddenly forming, and as quickly passing to the compound modifications.

The cumulus of fair weather has a moderate elevation and extent, and a well defined rounded surface. Previous to rain it increases more rapidly, appears lower in the atmosphere, and with its surface full of loose fleeces or protuberances.

Independently of the beauty and magnificence it adds to the face of nature, the cumulus serves to screen the earth from the direct rays of the sun, by its multiplied reflections, to diffuse, and, as it were, economise the light, and also to convey the product of evaporation to a distance from the place of its origin. The relations of the cumulus with the state of the barometer, &c. have not yet been sufficiently attended to.

The formation of large cumuli to leeward in a strong wind, indicates the approach of a calm with rain. When they do not disappear or subside about sun-set, but continue to rise, thunder is to be expected in the night.

Language.—Attempts have been made to account for the variety of languages in the world on natural principles. Difference of climate, intercourse with different nations, and the fondness of men for variety and change, are the principal causes assigned by those who take this ground.

Now it must be admitted, that difference of climate will cause some change in language in respect to pronunciation. It will abound in aspirates, labials, dentals, or other particular sounds, according to climate. Intercourse with different nations, also, introduces variety into language; but at the same time it tends rather to *assimilate* the languages of different nations to one another, than to *widen the difference*. With regard to a love of novelty and change, this is no doubt a cause of some alteration, especially when we consider the various circumstances which combine to render new words necessary.

"These are the general reasons of the mutability of language; and it is apparently true, that some or other of these have, ever since the confusion of Babel, kept the languages of the world in a continual variation. The Jews mixing with the Babylonians, when they were carried into captivity, quickly altered and corrupted their language, by introducing many Syracisms and Chaldaisms into it. And afterwards, when they became subject to the Greeks and Romans, their language became not only altered, but as it were lost, as any one will allow, who considers how vastly the Hebrew differs from the Rabbinical diction, and the language of the Talmuds. The Greek tongue in time suffered the same fate; and part of it may be ascribed to the Turks overrunning their country, and part of it to the translation of

the Roman empire to Constantinople. But some part of the change came from themselves, for, as Breerwood has observed, they had changed many of their ancient words long before the Turks broke in upon them; of which he gives several instances out of the books of Cedrenus, Nicetas, and other Greek writers.

"The numerous changes which the Latin tongue has undergone, may all be accounted for by the same reasons. They had in a series of years so diversified their language, that the Salian verses composed by Numa were scarcely understood by the priests in Quintilian's time; and there were but few antiquaries within about three hundred and fifty years who could read and give the sense of the articles of the treaty between Rome and Carthage, made a little after the expulsion of the kings. The laws of the twelve tables, collected by Fulvius Ursinus, and published in the words of the kings and decemviri who made them, are a specimen of the very great alteration which time introduced into the Latin tongue. Nay, the pillar in the capital, erected in honor of Drusillus, about one hundred and fifty years before Cicero, shows, that even so small a space of time as a century and a half caused great variations. After the Roman tongue attained the height of its purity, it quickly declined again, and became corrupted; partly from the number of servants kept at Rome, who could not be supposed to speak accurately and with judgment, and partly from the great concourse of strangers, who came from the remote provinces, so that the purity of it was in a great degree worn off and gone before the barbarisms of the Goths quite extinguished it.

"And what thus happened in the learned languages is equally observable in all other languages of the world: time and age vary every tongue on earth. Our English, the German, French, or any other, differs so much in three or four hundred years, that we find it difficult to understand the language of our forefathers; and our posterity will think ours as obsolete as we do the speech of those who lived ages ago. And all these alterations of the tongues may, I think, be sufficiently accounted for by some or other of the causes before assigned; but none of them shows how or by what means the confusion at Babel could be occasioned. Our builders had travelled from their ancestors many hundred miles, from Ararat to Shinar; the climates may differ, and suppose we should imagine the country to affect the pronunciation of the children born in it, yet still it will be hard to say that this should cause confusion; for since they were all born in or near the same place, they would be all equally affected, and speak all alike. Besides, a difference of pronunciation causes difficulties only where persons come to converse, after living a distance from one another. An imperfection in our children's speech, bred up under our wing, would be observed from its beginning, grow familiar to us as they grew up, and the confusion occasioned by it would be very little. And as to any commerce with other nations, they had none; they were neither conquered nor mingled with foreigners, so that they could not learn any strange words this way. And though there have been many changes of language from the variation of men's tempers, these we find have been frequent since this first confusion; but how or why they should arise at this time is the question. Language was fixed and stable, uniformly the same for almost two thousand years together; it was now some way or other unfixed, and has been so ever since. Some considerable writers seem to acknowledge themselves puzzled at this extraordinary accident. The confusion of tongues could not come from men, says St. Ambrose; for why should they incline to do mischief to themselves, or how could they invent so many languages as are in the world? It could not be occasioned by angels, good or bad, say Origen and the Rabbins, and other writers, for they have not power enough to do it. The express words of Moses, "Go to, let us go down and confound their language;" and again, "the Lord did confound the language of the earth," says Bishop Walton, imply a deliberate purpose of God himself to cause this confusion, and an actual execution of it. And the way in which it was performed, says the learned Bochart, immediately and without delay, proves it the immediate work of God, who alone can instantly effect the greatest purposes and designs. Several of the Rabbins have inquired more curiously into the affair; but we fear the account they have given of it is poor and trifling. Buxtorf has collected all their opinions; but they seem to have put him out of humor with the subject, and to occasion him to conclude in the words of Mercerus, "There is no reason to inquire too curious into this matter; it was effected instantly, in a way and manner of which we can give no account; we know many things were done; but *how* they were done, we cannot say. It is a matter of faith."

AGE OF THE WORLD.—We view it as a curious and deeply interesting fact, that all

the old poets and philosophers were impressed with an opinion that this earth is of recent production. "Had heaven and earth known no beginning," exclaims one, "but has endured from all eternity, *why have we no poets transmitting to us the knowledge of the great events prior to the Theban war, and the downfall of Troy?*" Lucretius entertained just notions on this subject:

> "If genial nature gave the heavens no birth,
> And from eternal ages rolled the earth,
> Why neither wars nor poets,—sages, tell—
> Till Homer sung how mighty Hector fell?

From the book of Genesis to the last geological surveys, even in New-England, by Professor Hitchcock, there is a chain of positive testimony, which shows most conclusively that the earth which we inhabit has not been in its present condition longer than about six thousand years. Cuvier, the most perfect scientific man of modern days, discovered enough to satisfy his great mind of the truth of all the declarations of the Bible in regard to the first organization of our earth.

Legends.—The monks of the dark ages imagined a saint to be holy in proportion to his filthiness. They said St. Ignatius delighted to appear abroad in dirty old shoes —that he never used a comb, but let his hair get matted, and religiously abstained from paring his nails. One saint attained to such piety as to have nearly three hundred patches on his inexpressibles, which after his death were hung up in public as an incentive to emulation. St. Francis discovered by certain experience that the devils were frightened away by such kind of economy, and that clean clothing animated them to tempt and seduce the wearers; and one of their heroes declares that the purest souls are in the dirtiest bodies.

In the life of St. Francis, we find, among other grotesque miracles, that he preached a sermon in a desert where he collected an immense audience, as the birds shrilly warbled at every sentence; and when he left off, they dispersed into four companies, to report his sermon to all the birds in the universe. He grew so intimate with a nightingale, that when a nest of swallows began to babble, he hushed them by desiring them not to tittle-tattle of their sister the nightingale. Attacked by a wolf, he, with only the sign manual of the cross, held a long dialogue with his rabid assailant, till the wolf, meek as a lap-dog, putting his paws into the hands of the saint, followed him through the town, and became half a Christian. This same St. Francis had such a detestation of the good things of this world, that he would never suffer his followers to touch money. St. Philip Nereius, too, was such a lover of poverty, that he frequently prayed that God would bring him to such a state as to stand in need of a penny, and find nobody that would give him one.

Of the fables of this period, the legend of St. Nicholas and the naked boys in the tub is a characteristic specimen. The fame of Nicholas' virtues was so great that an Asiatic gentleman, on sending his two sons to Athens for education, ordered them to call on the bishop for his benediction; but it being late in the day when they arrived at Mira, they thought proper to defer their visit till the morrow. They accordingly took lodgings at an inn, where the host, in order to secure their baggage and effects to himself, murdered them in their sleep; and having cut them in pieces, he salted them, and put them in a pickle-tub with some pork, meaning to sell them as such. The bishop, however, having had a vision of this impious transaction, immediately resorted to the inn; and calling the landlord to him, reproached him for his horrid villainy, when the man, perceiving that he was discovered, confessed his crime, and entreated the bishop to intercede with the Almighty for his pardon; upon which the bishop did beseech Almighty God, not only to pardon the murderer, but also for the glory of his name to restore life to the poor innocents who had been so inhumanly put to death. The saint had hardly finished his prayer when the mangled and detached pieces were by divine power reunited, and the youths perceiving they were alive again, threw themselves at the feet of the holy man to embrace and to kiss him; but the bishop, not suffering their humiliation, raised them up, and exhorted them to return thanks to God alone for this mark of his mercy; then advising them as to their future conduct, he sent them to prosecute their studies at Athens.

In another of the miraculous legends of ecclesiastical history, it is said that when the emperor Decius persecuted the Christians, seven noble youths of Ephesus having concealed themselves in a spacious cavern, the tyrant doomed them to perish there, giving orders that the entrance should be firmly secured with a pile of stones, but that they immediately fell into a deep slumber, which was miraculously prolonged without injuring the powers of life, during a period of one hundred and eighty-seven years. At the end of this time the slaves of Adolius, to whom the inheritance of the place had descended, removed the stones to supply ma-

terials for some rustic edifice, and the light of the sun darting into the cavern, the sleepers awoke, after, as they thought, a slumber of a few hours. They felt pressed by the calls of hunger, and resolved that Iamblichus, one of their number, should secretly return to the city and purchase bread for the use of his companions. The youth, if we may still employ that appellation, could no longer recognize the once familiar prospect of his native country, and his surprise was increased by the appearance of a large cross triumphantly erected over the principal gate of Ephesus, while his singular dress and obsolete language confounded the baker, to whom he offered an ancient medal of Decius as the current coin of the empire: when Iamblichus, on the suspicion of possessing a secret treasure, was dragged before the judge, and then mutual inquiries produced the amazing discovery that two centuries were almost elapsed since Iamblichus and his friends had escaped from the rage of a Pagan tyrant. The Bishop of Ephesus, the clergy, the magistrates, the people, and, it is said, the Emperor Theodosius himself, hastened to visit the cavern of the seven sleepers, who bestowed their benediction, related their story, and at the same instant peaceably expired. "This singular tale," Mr. Gibbon adds, "Mahomet learned when he drove his camels to the fairs of Syria, and he has introduced it as a divine revelation into the Koran. The same story has been adopted and adorned by all the nations from Bengal to Africa, who profess the Mahometan religion."—[London Mirror.]

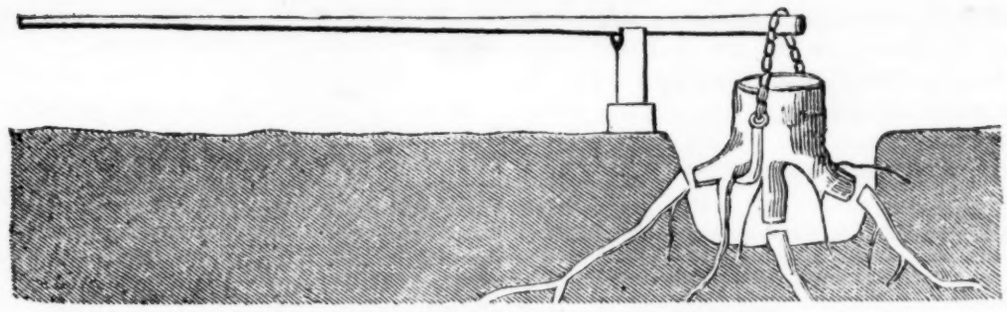
Spontaneous Combustion.—A circumstance came to our knowledge a few days since of spontaneous combustion, which, instead of throwing new light upon the subject, involves it in still deeper mystery. About two years since, the late Mr. S. C. Slaymaker presented to Mr. Adam Reigart, of this city, a small piece of wood, evidently cedar, found in excavating the deep cut of the railroad, at the Gap, in this county, about thirty feet below the surface. This piece, weighing not more than two ounces, was broken in two, and laid upon a white pine shelf in Mr. Reigart's counting room. About three or four days before the discovery was made, which I am about to describe, Mr. Whitaker, a gentleman who resides with Mr. Reigart, on wiping the dust from the shelf with a wet cloth, took up the pieces of wood, and after having dusted the shelf laid them as before. Three days after this it was accidentally discovered that one of the pieces had ignited, and combustion was progressing so rapidly that the shelf would have been in a few minutes on fire; and if it had happened at night, the consequences might have been very serious. On examination, a portion of one of the pieces was found reduced to ashes of a dark grey color, and from some of the outer fibres being sound, and ashes lodged in the interior, under them, it would appear that combustion had commenced, not upon the outer part of the wood, nor upon the side which lay in contact with the shelf, but in the interior of the stick, the surrounding fibres being disintegrated by the action of the fire within, and ready to fall to pieces.

The shelf was at least six feet from the floor, and so situated that no spark from a candle or lamp could have communicated with it, and upon close examination it is evident that the fire was not communicated externally.—[Lancaster (Penn.) Journal.]

A Chinese Historical Record.—"During the reign of Yaus, the seventh emperor, for six days together the sun never set, so that a general conflagration was apprehended." The result of this, remarks a well known writer, was a deluge which inundated the whole of China. The epoch of this flood and the universal deluge, as related by Moses, were in the same century. Yaus was born 2307 years before Christ, and the general deluge happened 2348 years before the remarkable era referred to, according to an exact Hebrew computation. Farther, in confirmation of the Mosaic record, if any corroborative testimony were necessary, the Egyptian traditions respecting certain strange alterations of the sun's course in the heavens might be readily cited. Indeed, the traditions of every nation, tribe, and people, whether on islands or continents, relate to an awful deluge, which destroyed all human beings but one family.

Spiders.—Nearly one hundred and fifty species of spiders exist in the United States. Spiders come out of the egg in a very minute state, but continue to increase in bulk, it is thought, by entomologists, for several years. The *araneides* vary in color at different periods. The insects of Massachusetts alone cannot vary much from 7,000 species.

Sand of Pekin.—All travellers, says St. Pierre, who had been in Pekin, are agreed that it is not possible to go abroad, during a part of the year, into the streets of the city, without having the face covered with a veil, on account of the sand with which the air is loaded.



Practical Hints to Emigrants on the Clearing of Lands. By Wm. Reed. [From the London Mechanics' Magazine.]

Sir,—One of your correspondents, some time back, recommended circular saws for cutting timber or trees down, the saws to be about four feet in diameter! You published also an account of some machines for horizontal cutting, patronised by the Highland Society of Scotland. Now, sir, I have some circular saws of thirty inches in diameter, and these are the largest I ever saw. We make no use of them, however, having no power to spare for driving them. They were made in London, and cost more than ten guineas each, which, considering the difficulty of making them, and that many are spoiled through cracks or flaws in the hardening, was not dear; but as for saws of four feet diameter, it is not likely they could be made, or used when made, as even sixteen-inch saws soon heat and buckle. Supposing, however, these difficulties were got over, how can poor colonists, some with not £5 in their pocket, be expected to lay out ten guineas, or more, for sawing machines? People, with guineas to spare, go not abroad to fell woods. The men that do go are the poor and needy, who, if they would thrive, must work hard, and not stand upon trifles. There must be no staying for this or that; they must make the best shift they can with what comes readiest to their hands. To illustrate what I have said about circular saws, take the following example: When, in 1803, the Golden lane subscription brewery was set on foot, an old shopmate of mine, of the name of Green, was employed there as millwright. Having occasion for some thin deals, but none being at hand, he thought, as he had a two-feet circular saw running, and plenty of three-inch deals, that if they put two cuts through one of these three-inch deals, they would have what was wanted. Accordingly, he and another man set the saw to work, laying on all the power of the engine, which was one of twelve or sixteen horse power; but they found that if they pushed the deal ever so little too fast, it completely stopped the engine. Now, if cutting a three-inch deal with a two-feet saw stops a twelve horse engine, how will two poor men work a four-feet circular saw? No, my emigrant friends, if you have the means of taking out a few tools with you, let them be of the simplest and cheapest sort, such as a good axe, a hand-saw, a cross-cut saw, (for if two men or families unite, they may cross-cut a tree down in less time than by chopping,) a spade, with pick-axe and crow-bar, gimblets, nails, two or three augers, mortice chisels, &c. not forgetting that most useful of all tools, a grind-stone, and two or three triangular files (*vulgo*, three-square,) for sharpening your saws, or they will soon be as useless as a gun without a lock or flint. No time the first year to grub up roots; enough to do to raise, with spade labor, a crop of potatoes, corn, &c. Let the roots rot, or try to burn them in their places, as I have seen German colonists do. When time admits, the following very simple mode of extraction may be adopted. After removing the earth from around the main stump, and cutting the principal branching roots quite through, take a long slender tree, like a scaffolding pole, such as two persons can lift, as a lever; hang two strong hooks with a bit of chain cable, from the short end of this lever; attach these hooks to the under end of the stump; place an upright support at a little distance from the stump, to serve as a fulcrum, (all as represented in the prefixed rough sketch,) and then pull away at the lever with all your might. This will be found a far more simple method than any of the expensive ones recommended by the Highland Society, or others, and, I doubt not, equally efficient. It would be as well, however, to consider before cutting some trees down, whether the tree itself might not be made a lever of to extract the roots. Fir trees, and several others, project their roots but a little way from the surface of the ground, so that by digging a little round the roots, and cutting through the large fibres, many might be pulled down by means of a rope fastened to the top.

I hope some of your more able corres-

pondents will pursue the subject; for when the poor emigrant is far away from help, things do not always turn up so pleasantly as they did with that prince of colonists, Robinson Crusoe.

I am, sir, your obedient servant,

WM. REED.

Peterhoff Paper-Mill, near St. Petersburgh, Jan. 1834.

SELF-TAUGHT MECHANIST.—A boy, of the name of John Young, now (1829) residing at Newton-upon-Ayre, in Scotland, constructed a singular piece of mechanism, which attracted much notice among the ingenious and scientific. A box about three feet long by two broad, and six or eight inches deep, had a frame and paper covering erected on it in the form of a house. On the upper part of the box are a number of wooden figures, about two or three inches high, representing people employed in those trades or sciences with which the boy is familiar. The whole are put in motion at the same time by machinery within the box, acted upon by a handle, like that of a hand organ. A weaver upon his loom with a fly-shuttle, uses his hands and feet, and keeps his eye upon the shuttle as it passes across the web. A soldier, sitting with a sailor at a public house table, fills a glass, drinks it off, then knocks upon the table, upon which an old woman opens a door, makes her appearance, and they retire. Two shoemakers upon their stools are seen, the one beating leather, the other stitching a shoe. A cloth-dresser, a stone-cutter, a cooper, a tailor, a woman churning, and one teazling wool, are all at work. There is also a carpenter sawing a piece of wood, and two blacksmiths beating a piece of iron, the one using a sledge, and the other a small hammer; a boy turning a grindstone, while a man grinds an instrument upon it; and a barber shaving a man whom he holds fast by the nose with one hand.

The boy was only about seventeen years of age when he completed his curious work, and since the bent of his mind could be first marked, his only amusement was that of working with a knife and making little mechanical figures; this is the more extraordinary, as he has no opportunity whatever of seeing any person employed in a similar way. He was bred a weaver, with his father; and since he could be employed at the trade, has had no time for his favorite study, except after the work ceased, or during the intervals; and the only tool he has had to assist him was a pocket knife. In his earliest years he produced several curiosities on a similar scale, but the one now described is his greatest work, to which he devoted all his spare time during two years.

STOVES.—Our readers may perhaps be a little surprized at our taste in calling their attention to the subject of stoves in the month of August. But no other apology is necessary than simply assuring them that a discovery has been made, somewhat recently, of a method of warming apartments by an uncommonly economical contrivance, which must recommend itself to every candid observer. Autumn will make its advances by and by, and when Boreas begins his howlings round the best constructed dwelling, there is peculiar satisfaction in knowing that the approaches of cold weather can be met at the threshold with impunity.

But to the point: Thomas G. Fessenden, Esq. extensively known as an author, and particularly by his efforts in scientific agriculture, as editor of the New-England Farmer, has constructed a stove, which is truly a fuel-saving invention. That it may be talked about and tried, we have ventured thus seasonably to recommend it to patronage abroad. The principle on which its excellence depends is so simple, that on that account alone it presents a stronger claim to patronage. Fessenden's stoves are always convenient, on account of the volume of hot water which they contain.

They are also comforts, because they radiate heat with a comparatively small quantity of fuel. And they are wholesome too, because an evaporation is continually going on from the surface of the water concealed within an urn. Finally, the room is warmed by hot water, and not by the fire that heats the water.

Had Mr. Fessenden furnished himself with an engraving of his *Economist*, a name we have christened it by, we should have made the attempt to borrow it for this page; but we shall, nevertheless, recommend the stove for school rooms, libraries, and halls, in which large assemblies meet, as being altogether superior to the thousand-and-one inventions already stowed away in the patent office. Menageries too, as already remarked in the first volume of the Tracts, would save their animals from premature death by the gentle warmth given out by this comfort-taking contrivance.

Perhaps all this recommendatory notice may fail of its object, and no one beyond the Allegany mountains may be induced to order Mr. Fessenden's stove from Boston; still, however, we have done all we are able to do to extend the reputation and high claims of the Economist, which is completely phi-

losophical in all its parts. Mr. Fessenden is a gentleman of science, and that fact is itself sufficient to elicit the attention of well informed men.—[Scientific Tracts.]

Specification of the Patent granted to JAMES CHESTERMAN, *of Sheffield, in the County of York, Mechanic, for certain Improvements on Machines or Apparatus for Measuring Land and other Purposes.* Sealed July 14, 1829. [From the Repertory of Arts, &c.]

To all to whom these presents shall come, &c. &c. *Now know ye,* that in compliance with the said proviso, I, the said James Chesterman, do hereby declare the nature of my said invention to consist in what is commonly called a measuring tape, in which the cylinder or barrel on which the tape is wound is connected with a strong watch or clock spring, according to the size required, in such manner as to wind up the tape after it has been drawn out, without any effort on the part of the operator. And in further compliance with the said proviso, I, the said James Chesterman, do hereby describe the manner in which my said invention is to be performed, by the following description thereof, reference being had to the drawings annexed, and to the figures and letters marked thereon (that is to say):

Fig. 1.

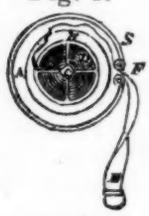


Fig. 2.

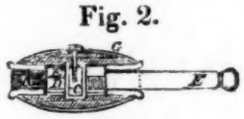


Fig. 4.

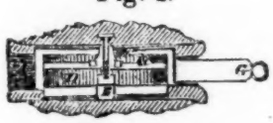


Fig. 3.

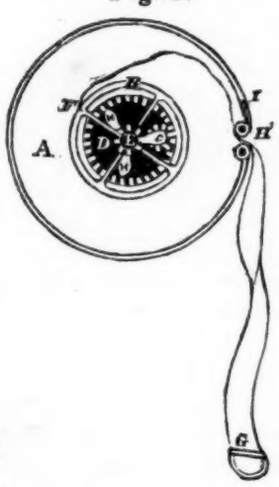


Fig. 1 represents one of my improved measuring machines of a short length, as, for instance, a yard, for which length a simple attachment of the cylinder or barrel on which the tape is wound to an ordinary strong steel spring is sufficient, as here shown. A is the outer case of the machine; B, the cylinder to which the tape is fastened, and which forms also the box of the spring; C, the stud to which the spring is attached, being also the axis on which the cylinder turns; D, the spring coiled round in the box; E, the tape and loop to pull it out by; F, two rollers, between which the tape passes; I, a small bolt which pushes the tape against one of the rollers, and thus stops it at any given length till the bolt is withdrawn.

Fig. 2 is a section of fig. 1, in which similar letters are used to denote similar parts. G is a top or cover screwed down upon the case over the works, to keep the same in their places when the spring is in action.

Fig. 3 represents one of my improved measuring machines of a larger size, and a greater length of tape, for which it is necessary to provide that the tape shall wind up on the cylinder faster than the spring unwinds from the stud or axis, otherwise the spring would be of an inconvenient length; this is effected by an arrangement of cogged wheels, or racks and pinions, as here shewn. A is the outer case of the machine; B, the cylinder on which the tape is wound, and which, in this case, is separated from the box which holds the spring; D is the spring lying coiled in its box, and it will be seen that the box is furnished inside its upper rim with a rack or cogs, which take into the cogged wheel at C, which, in its turn, takes into the pinion E. This pinion is fixed to the four arms of the tape cylinder, B, the axis of which pinion serves to form a stud to fasten the inner end of the spring to the arms. H, H, C, serve to keep the spring in its place while in action. The rest of the apparatus is the same as figure 1. Now it will be seen by this arrangement, that while the tape is drawing out or off the cylinder B, the pinion E will act upon the cogged wheel at C, which cogged wheel, taking into the rack inside the spring box, will wind the spring slowly up, and the cylinder will thus perform several revolutions to one of the spring box. If the tape then be released, the rack attached to the spring box communicates motion to the cogged wheel at C, and thence to the pinion, E, which winds up the tape with the same relative velocity.

Fig. 4 is a section of fig. 3, in which G represents the cover or top of the machine, which part is supposed to be removed in figs. 1 and 3, for the purpose of better showing the mechanical arrangement of the machine.

Now, whereas it is evident that this instrument is susceptible of various modifications both as to material and arrangement, but whereas, I claim as my invention the application of a spring to make it a self-winding instrument, together with the application of two speeds, in order to make the sort of spring here shown answer for long tapes, and also the adjusting bolt, I; and such my invention being, to the best of my

knowledge and belief, entirely new and never before used within that part of his said Majesty's United Kingdom of Great Britain and Ireland called England, his said dominion of Wales or town of Berwick-upon-Tweed, I do hereby declare this to be my specification of the same, and that I do verily believe this my said specification doth comply in all respects fully and without reserve or disguise with the proviso in the said hereinbefore in part recited letters patent contained; wherefore, I do hereby claim to maintain exclusive right and privilege to my said invention.—In witness whereof, &c.

Enrolled January 9, 1830.

Philosophical Facts.—Sound travels 1132 feet in one second, or 13 miles in a minute. The softest whisper flies as fast as the loudest thunder; and no sound produced by artificial means can be heard over 200 miles. In the war between England and Holland, in 1672, the guns were heard in those parts of Wales judged to be nearly 200 miles distant from the scene of action; but sounds arising from volcanoes have been heard at a much greater distance.

Light goes about 13,000,000 of miles in one minute. A strong wind flies 20 feet in a second. If the distance between us and a cannon when fired be one mile, we hear the report 24 seconds after we see the flash. The nearest of the fixed stars is 5000 times more distant from us than the sun: its distance, then, must be 77,400,000,000 miles. Were a cannon fired from a star, it would require 5,400,000 years for the report to reach us. The hardest metals on which common fires, and even glass-house furnaces, could produce no effect, have been melted in a few seconds by means of *lenses* or *mirrors* called *burning glasses*. M. Villet, a native of France, about 100 years since constructed a *mirror* 3 feet 11 inches in diameter, and 3 feet 2 inches focal distance, which was so powerful that it melted *copper ore* in 8 seconds, *iron ore* in 24 seconds, a fish's tooth in 32 seconds, cast iron in 16 seconds, a silver sixpence in 7 seconds, and tin in 3 seconds. M. Villet's mirror condensed the rays of the sun 17,257 times, a degree of heat which is about 190 times greater than common fire.

Mr. Parker, of London, constructed a lens 3 feet in diameter, focus 6 feet 8 inches, weighing 212 pounds. It melted 20 grains of *gold* in 4 seconds, and 10 grains of *platina* in 3 seconds. The broader the lens and shorter the focal distance, the more intense is the heat produced by such instruments. A globular decanter of water is a powerful burning glass, and furniture of houses has taken fire by incautiously leaving it exposed to the sun's rays.—[Lynceus.]

Industry and Perseverance.—That "industry and perseverance will overcome every obstacle," should be a motto for young persons, especially, who are ambitious to pursue an active and useful life. It is necessary in the attainment of an object, not only to be industrious while actually engaged in it, but to continue such exertions until the goal is reached. We might mention an hundred instances which have come under our observation, where persons, apparently the most laborious of beings, have yet failed in every thing they have undertaken. The simple reason was, they did not possess energy of mind sufficient to carry them to the end of a project; but frightened by the obstacles that started up in their path, and which to them appeared insurmountable, they relinquished their undertaking and commenced something else, which in time shared the fate of the former.

To attain a difficult object, you must not only be industrious while employed in it, but you must persevere until it is fully accomplished: it is necessary in youth, it is necessary in every period, in every station in life. We might multiply examples without number. What was it that raised Franklin from a poor printer's boy to be the first philosopher of the age? Industry and perseverance. What made Sherman, who at the age of twenty-eight was a journeyman shoemaker, and could not even read,—what made him a distinguished lawyer and statesman? Industry and perseverance. What made Ferguson the greatest astronomer of his time in England,—who started in life as a poor unnoticed shepherd's boy? Industry and perseverance. And why did West, who attended his father's inn in the country, and amused himself wiih drawing the faces of his customers in charcoal,—why did he become the greatest painter of modern times? He was industrious, and he persevered in it. In short, what man has ever made himself distinguished without industry and perseverance. Their examples should stimulate us to exertion.—[Y. Comp.]

An Economical Substitute for Copying Machines.—In the common ink used for writing, dissolve with it one drachmn of loaf sugar to each ounce of ink, moisten a sheet of unsized paper to copy with, and put it between two sheets of the same paper to absorb the superfluous moisture; then put the moistened paper on the writing, when by passing a ruler once or twice over its surface, you will have a

perfect fac-simile struck through the copy paper, without injuring the original in the least. —[Daily Adv.]

SHELLS ON THE SNOWY MOUNTAINS OF THIBET.—At a meeting of the Asiatic Society of Calcutta, on the 5th May last, extracts from Mr. Gerard's letters, relative to the fossil shells collected by him in his late tour over the snowy mountains of the Thibet frontier, were read. The loftiest altitude at which he picked up some of them was on the crest of a pass, elevated 17,000 feet: and here also were fragments of rocks, bearing the impression of shells, which must have been detached from the contiguous peaks rising far above the elevated level. Generally, however, the rocks formed of these shells are at an altitude of 16,000 feet, *and one cliff was a mile in perpendicular height above the nearest level.* Mr. Gerard farther states, "Just before crossing the boundary of Ludak into Bussalier, I was exceedingly gratified by the discovery of a bed of fossil oysters, clinging to the rock as if they had been alive." In whatever point of view we are to consider the subject, it is sublime to think of millions of organic remains lying at such an extraordinary altitude, and of vast cliffs of rocks formed out of them, frowning over the illimitable and desolate waters, where the ocean once rolled.—[Asiatic Register.]

Proposed Road for Locomotive Engines. To the Editor of the Railroad Journal, and Advocate of Internal Improvements.

SIR,—It must be apparent to those who notice the progress of improvements, and especially to the readers of your valuable journal, that a new era in this branch of the economy has commenced.

The enthusiasm which seems to pervade our country, to say nothing of the old world, for establishing railroads and canals, will put a new face upon human economy. Inland commerce, and even military movements, will scarcely feel the obstacles of time and space, which once so fearfully embarrassed their operations.

Whoever will consider the unsatisfying nature of all partial improvements, and the excessive anxiety to extend them, not merely through all the great thoroughfares for travelling and transportation, but to every hamlet in the country, will realize the truth of what may otherwise seem extravagant.

There is no good however without an alloy. The enthusiasm and spirit of competition which so excites the public mind will no doubt often cause an unprofitable expenditure and misapplication of large sums of money, which the owner can illy afford to lose. Railroads will be made at unnecessary cost, and in places where the business would not pay for them at the lowest cost. It has occurred to the writer of this article that this evil may be at least somewhat remedied, and without checking in the least the public ardor for improvement. A just regard for economy requires that every device for transportation should be apportioned, in its expense, to the business to be done. A road from Baltimore to the Ohio must not be allowed to cost as much per mile as one from Liverpool to Manchester; or if it must cost as much, the work can only be done by posterity.

This course of reflection is presented to the reader because it led the writer to the conclusion that a road, which can be constructed much cheaper and repaired at less expense than a railroad, and yet approaching its convenience and usefulness, is a great desideratum in the present system of improvements. To accomplish this end, it is proposed to make a road in the following manner, viz.: The route having been selected and line determined, with great care, let the grading be done in the usual manner, varying in width from 12 to 24 feet, making the narrowest parts where the work is most expensive, and vice versa; when the embankment is formed, roll it down well with a massive cast iron roll, then put on a coat of gravel or shell stone about 4 inches thick, and roll again. When the road is finished, let it be used as follows: No other power than a locomotive engine to be permitted; these are cheaper than horses, especially when, as in this case, they require but little weight to prevent the slipping of the wheels. All the cars or waggons to be used must have wheels whose width is apportioned to their load, say none less than 8 inches wide; and to prevent injury to the road, one axletree of the waggon should be shorter than the other, so that two 8-inch wheels might roll 12 inches, or cars for light loads may be made with three narrow wheels, two before and one behind, or reversed, as might be found most convenient.

Different waggons should not all be of the same width: the more diversity in this respect the better. It can scarcely be doubted that, with such power and vehicles, the road would easily be kept smooth, and become very hard. Constant but not expensive attention would be required to fill up any depression with proper materials. Drains must be kept open and care taken to let the water run off at the sides. In the winter, a broom attached to a car, with gearing similar to that which is used to water city streets, could be made to sweep off all the snow. This apparatus, as well as the waggon which supplied the gravel, &c., for repairing, could be attached to one of the trains at pleasure, with very little expense for power. It is unnecessary to state in detail all the arrangements that may be made for preserving the road and promoting economy. The heaving of the frost in winter will de deemed perhaps the most formidable obstacle to this form of road; but it is not found that paved streets, or the M'Adam's road, or even the common stone turnpike, is injuriously affected by this cause. They are injured by the pressure of heavy loads on narrow wheels, while the earth is soft. If the pressure were upon a greater surface, the injury would be diminished. The nearer we can arrive at an equal action or stress, upon all the parts of any mass of matter,

the less effect will be produced on each of those parts; and the more solid the material, and uniform the condition, of any such mass, the greater will be its power of resistance. To attain the first, the wide wheel is relied on; and the last is approached by grading the road as much as practicable some two or three feet above the common surface, and where excavations are necessary, keeping out the water by drains. In wet springy grounds, grubble stone may be found essential. The dryer the road is kept, the less will be the effect of frost; and the more uniform the moisure in it, the less will any part be displaced by freezing or thawing, by reason of the expansion and contraction of all the parts together.

Good gravel turnpikes, where heavy loads are not put on them, keep their form remarkably well, with but little care in repairing, although exposed to the action of horses' feet, and of narrow wheels always running in the same rut. The road from Baltimore to Washington is an example of this kind. The public gravel walks in the cities are not injured by frost or rain, and one of the means for averting such injury is rolling them with heavy rollers, not unlike, but less effective, than the rolling of the wheels of the waggons, as proposed. These considerations have satisfied the writer that no serious inconvenience is to be apprehended from frost, and that the road may be used with but little interruption from that cause throughout the year in any part of the United States. Heavy drifting snows would perhaps be thought difficult to conquer; but it is known that there occurred, during the winter of 1830–31, an unusally severe drifting snow, and yet the cars on the Baltimore and Ohio railroad were not stopped, even in their deep cuts, more than a single day; the snow being swept off as fast as it fell on the road, by a machine attached to the cars. It remains to notice some of the peculiar advantages of the proposed road. Here it should be observed that it is not intended to recommend it as preferable to a railroad, where the assurance of business will justify the expense of the latter; but as a valuable substitute where that is not the case, and as being free from some important objections to which railroads are liable.

The proposed road must, as well as railroads, necessarily be under the exclusive direction of a company, or of a special municipal authority, which has power to prescribe and enforce regulations; but these regulations will admit of a much more diversified operation of business than can be conducted on a railroad: the vehicles for transportation may meet or pass at pleasure, and may be drawn at any speed suited to the business of the owners. Companies or individuals running stages, carrying the mail, transporting merchandize, or heavy products, having their respective establishments of engines and trains, may each start at their own time, and run at the most convenient speed. Where there are no ruts, the slow train may easily turn out for the faster one to pass. This operation approaches very nearly to all the advantages of a road for general business, gives full scope to competition, and of course protects the community from some of the dangers of monopoly. Another essential advantage of this road is, that an engine of light construction may exert a much greater power in ascents than can be done where the wheels run upon an iron rail.

As this is an important consideration, I may be excused for presenting it more distinctly.

A locomotive engine, weighing 6 tons, where all the wheels are worked, is ascertained by experiment to contain an adhesive power of 672 lbs. on a level, which is one-twentieth of its weight. This engine will draw a load of 17,658 lbs. in addition to its own weight, without detrimental slipping of the wheels, up a plane of 1 foot in 50. The proportion which the adhesive power of wheels on a gravel road bears to the weight of the car is not yet accurately ascertained; but when it is considered that the diameter of the wheels may be greater than would be safe for those of railroad cars, it will not be unreasonable to estimate the adhesion at one-eighth the weight of the car, two-thirds of the load resting on the working wheels. Even on the iron rail, the adhesion has been found under very favorable circumstances more than one-tenth of the weight upon the wheels. According to the proposed estimate of one-eighth, an engine weighing 3 tons contains adhesive power of 830 lbs. On a level, and after making the proper deductions as before, for the gravity of the engine and its diminished pressure on the ascending plane, its adhesive power will, on a plane of 1 in 50, be sufficient for drawing a load of 28,450 lbs. in addition to its own weight. If the ascent of the plane be 1 in 25, the effective adhesive power of the six-ton railroad engine will only be sufficient for a load of 2,320 lbs., while that of the three-ton gravel road engine will suffice for a load of 14,700 lbs. The calculations for these results are made from the usual allowance of 10 lbs. to the ton for the friction of the loaded cars; that for the engine car, being a constant quantity, is not taken into account. An allowance is made also for the diminution of pressure, and consequently of adhesion on the planes, which, although neglected by the writers on railroads which I have met with, is an important item. From these facts it will be seen, that upon the hard gravel road an engine will have adhesion enough to employ a much greater portion of its steam power on ascents than can be effected on a railroad; and consequently, the engine being less embarrassed by its own weight, may be proportionably lighter. It is also apparent that when the whole steam power of an engine can be exerted, without slipping the wheels, it can ascend much steeper acclivities. To what extent this may be accomplished, remains to be ascertained; but if ascents of 1 in 20 can be overcome, there will be no difficulty in crossing over a mountainous country without the aid of any other machinery than the locomotive engine. There are few mountains which may not be graded to four and one-third degrees. There is another consideration which strongly recommends the proposed road: wherever the

grades are not too steep, the road will be a perfect preparation for laying a double track of rails, which may be done as soon as business will justify. The steep acclivities must necessarily be overcome by other means, and the location adapted to such change of plan. In conclusion, it may be remarked that the most effective plan of transportation, whether it be railroad or canal, should be adopted, when the business will justify the expense, and all other plans must be regulated by the same considerations, viz.: business and expense.

The pioneers of the wilderness are obliged to begin with a pack-horse path, while the people of the Atlantic border, with their hundreds of passengers and tons of merchandize passing daily, may afford to make railroads at almost any expense. All intermediate conditions of business must necessarily adapt their roads to their circumstances. Each path or road, however little frequented, is tributary to others in more general use, which, like the streams passing from the summit regions to the ocean, gather business as they progress, and justify a proportionate expense in their improvement. And prudent men, however ardent their impatience to have the best roads, will be governed by the circumstances in which they are placed. It is in this view that a road which is preferable to the common turnpike, and cheaper than a railroad, is a desideratum in our transportation economy.

The varied ingenuity of those whose attention is now engaged in improvements, will no doubt discover some objections, and probable advantages, too, which have not occurred to the undersigned. The subject is however submitted to that candid consideration of an intelligent public, which cannot easily be led astray by unsubstantial projects. It may be observed, that the locomotive engines have been for some time in operation in England on common roads, where the projectors seem to be sanguine of entire success; but if they can be used on roads where horses' feet and narrow wheels are permitted to break the even surface, and over the hills of common turnpikes, how much better will they work on a road prepared and used as above proposed. Yours, &c., J.

Improved Wheels for Railroad Cars.—We have in our possession, which may be seen at any time, a piece of the *rim* of a Railroad *Car Wheel*, made upon a plan which, we think, will prevent accidents which sometimes occur from the failure or breaking of a wheel, when going at high speed. The wheel is entirely of cast iron, except a hoop of half inch *wrought iron* wire, enclosed or *cast in* the *rim* of the wheel, and which, even in case of the fracture of the cast iron, prevents the wheel from falling apart until another can be supplied. It serves also to produce an equal *chill*, or degree of hardness, in the cast iron, which, we are told, has heretofore been difficult to attain, in consequence of the increased thickness, or body of material, at the curve forming the flange—the point where this rod, or hoop, is enclosed—and thereby prevents the more rapid wear of that, than the other part of the rim. The introduction of this wrought iron must, we think, produce beneficial results, unless it should, as it may in some instances, produce imperfection in the cast iron: to detect which, should it exist, the wheel must in all cases be subjected to a severe test.

The part left at this office is of a wheel broken with a sledge, to test its utility. The cast iron was broken in many places, yet the wheel kept its shape, and could only be separated by cutting the rod with a cold chisel—which had, in the operation of casting, become annealed.

We find, on reference to the last annual report of the President of the Baltimore and Ohio Railroad Co., that they have been introduced on that road, and are thus spoken of by him: "Besides the improvements in the locomotive engine, others have been made in the machinery used by the company, and particularly in the construction of the wheels of the cars—by which an iron rod is introduced into the wheel when cast, which not only adds to the hardness of the surface, by perfecting the chill, but increases, in a great degree, the safety of the wheel itself."

With such testimony in its favor, we may, with great confidence, recommend it to railroad companies in want of wheels, either for passenger or freight cars, and would refer them to Mr. Dean Walker, care of Messrs. J. W. & E. Patterson, Baltimore.

Mr. Walker, we are informed, is the patentee and manufacturer, and offers to supply wheels of this description on as reasonable terms as they can be supplied without the rod, and also to have them proved before they are paid for.—[Railroad Journal.]

New Locomotive Engine.—[*From a correspondent at Liverpool.*]—On the 22d of June, a new Locomotive Engine, made by Messrs. Forrester & Co. of Vauxhall Foundry, was tried on the Liverpool and Manchester Railway. The experiment was crowned with the most brilliant success; the engine, which is called the Vauxhall, was proved to be the most powerful and rapid engine ever on the line.

At eleven A. M. she left the Liverpool station with an extra train of carriages and luggage, and arrived at Manchester, (32 miles,) in 57 minutes. On her return she brought a very full train of first class carriages, a private carriage mounted on a surry, and a heavy luggage waggon, in 67 minutes.

She mounted the inclined planes in grand style. The distance has been run in less time, but never with any thing approaching the weight this engine drew.

She is intended for the Dublin and Kingstown railway, the Directors of which, attended by C. B. Vignoles, Esq. their Engineer, accompanied the engine to and from Manchester, and were highly pleased with the satisfactory result of the experiment.

LIFE AND DEATH.—In a year it is computed that there are 23,729,000 births on the globe; in every twenty-four hours, 65,000; in an hour, 2,700; in every minute, 45. On the other hand, the total number of deaths in a year is 21,212,000; being 58,000 every day, 2,400 every hour, and 40 every minute of time. Were it not for wars and epidemics, the entire increase of population throughout the earth in one year would amount, it is supposed, to 2,517,000. Nearly one quarter die in the first year of their life; one third of the survivors in the course of two years; and scarcely one in ten lives to the age of seventy.

SCOTLAND.—HISTORICAL MEMORANDA.—No country has made more progress in agricultural improvement, and in multiplying the comforts of life, than Scotland during the last fifty years. The Rev. C. Peebles, in his statistical account of Mains, in Angus, draws a curious comparison between the farmers in 1760, when he came among them, and 1790. The following are a few points:

1760.	1790.
Land ploughed with oxen. Only a few horses kept to draw the harrow in seed time, and bring in the corn in harvest. 7*l.* thought a great price for a horse.	Oxen not employed in agriculture. Farmers have their saddle horses, worth from 24 to 30*l.*, and work horses from 20 to 25*l.* each.
Land rented for 6*s.* per acre, and only two small farms enclosed.	Land at 30*s.* and all enclosed with dykes and thorn hedges.
No English cloth worn but by the minister and a Quaker.	There are few who do not wear English cloth, and several the best superfine.
Men's stockings were what were called plaiding hose, made of woolen cloth. The women wore coarse plaids. Not a cloak or a bonnet was worn by any woman in the whole parish.	Cotton and thread stockings are worn by both sexes, masters and servants. The women who wear plaids have them fine and faced with silk. Silk plaids, cloaks and bonnets, are very numerous.
Only two hats in the parish. The men wore cloth bonnets.	Few bonnets are worn, and the bonnet-maker's trade is given up.
There was only one eight-day clock in the parish, six watches, and one tea-kettle.	Thirty clocks, one hundred watches, and above sixty tea-kettles.
The people never visited each other except at Christmas. The entertainment was broth and beef, and the visitors sent to some ale-house for five or six pints of ale, and were merry over it without any ceremony.	People visit each other often. Six or seven dishes are set on the table differently dressed. After dinner a bowl of rum punch or whiskey toddy is drank,—then tea, then another bowl, then supper, and, after that, the grace drink.

DIFFUSION OF KNOWLEDGE.—A royal Sardinian edict was promulgated, so lately as 1825, which forbade every person from learning to read or write, who could not prove the possession of property above the value of fifteen hundred livres. To become a student, the possession of an income of the same sum is necessary.

SIMPLE REMEDY FOR THE ASIATIC CHOLERA.—Professor Oertel, of Anspach, (Germany,) cures the Cholera extensively with *cold water*. He some time ago published a pamphlet on the subject, dedicated to the King of Prussia, who presented him with a gold medal. Among other things contained therein, is the following:

"The most severe fasting—much drinking of cold water—much washing with cold water—in short, a complete inundation of the whole human body with cold water, both inwardly and outwardly!

"If those persons whom the Cholera has swept away at St. Petersburgh, would have been (at the commencement of the disease) washed and rubbed well with water, then dried, laid in a bed, and plenty of cold water administered for drink,—what (inquires Professor Oertel) would have been the consequences? If there exists a remedy against the effects of this fatal disease, it is positive and singly *cold fresh water!*—courageously, properly, and perseveringly applied. Therefore, on such constitutions that apply cold water plentifully, both inwardly and outwardly, *the Cholera will and can have no effect!*

"If that does not help, nothing else can! The fresh water does not give a cold; it only creates a momentary chill, and produces thereupon warmth, evaporations, and even perspiration; it does not drive any thing into the body, but expels it; it does not oppress the vital faculties, but promotes the ordinary discharges of the skin, and invigorates the whole nervous system; it penetrates the most minute vessels of the human body without irritation, only so much as to produce an equilibrium of the blood and other succulent fluids. It prevents and disperses inflammations, swellings, ulcers, lameness, weakness, and pains. Where now is another human specific of equal power and effect?"

Shame enough that it has to be told to certain persons in this enlightened day! At the conclusion, the Professor solicits in particular—

"First, all practitioners of medicine, after having in vain applied all their artful remedies, to try this *one* and *only sure* remedy, (which nature has given us,) in order that their otherwise organic well patients are not left to suffer and die of nervous, scarlet, and other fevers, and of inflammations of the brain, lungs, and bowels, as is the case in many instances.

"Secondly, requesting all Governments to establish this safe and uniform cold water cure, and to charge all doctors and other persons therewith, thereby commencing a necessary reform of the present uncertain remedies of the faculty of physic.

"PROF. OERTEL, of Germany."

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